

Introducing the Econet®
Acom Computer local area network

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Now there is a simple and cost-effective way to link up a series of microcomputers. It is the Econet system, created by Acom Computers - the team who designed the BBC Microcomputer.

The Econet network system, which is only a fraction of the cost of comparable networks, allows up to 254 computers to communicate with each other and to share expensive resources such as printer or disc drives.

An Econet system consists of a number of units which are described in this leaflet. To set up a network system you will normally need the following items.

Econet work stations

Usually BBC computers fitted with Econet interfaces to allow communication both to other stations and to shared network facilities.

A file server station

A BBC computer dedicated to running a program called the file server, which offers shared access to the file server's disc storage.

A printer server station

A BBC computer fitted with EPROM containing the printer server program, which offers shared access to the printer server's printer.

Cable

For short networks a modular cable system is available for rapid installation. For longer networks a high quality cable is available.

Two terminator boxes

One at each end of the network to terminate the line.

One clock box

Which is plugged into the network somewhere near its central point.

Econet work stations

A BBC computer model A or B with an Econet interface can be plugged into the network with the cable provided. Any of the other interfaces available for the BBC computer may be fitted without affecting the operation of the station on the Econet. So an Econet station may be fitted with its own local disc storage. Teletext adaptor or Prestel interface as required.

The Econet interface includes an 8K ROM which

contains the Network Filing System (NFS) and the low level primitives that are used for network communications. Thus the user has a number of commands available via the computer keyboard to control the storage of his file on the file server and the use of the printer server. It is these routines which constitute the NFS.

As the file server is not necessary for the control of Econet transfers it is possible to run a network without a file or printer server. In this case most of the keyboard level commands will not be available to the user. Network communication would then rely on calls to the network primitives from the user routines. The network primitives are available via a number of operating system calls and may be called either from Basic or from user machine code routines.

Each computer ordered with Econet interface is supplied with a manual describing the user commands available and also the use of the Econet primitives.

File servers

Acom currently support two levels of file server which supply two distinct levels of service to the network user. The level 1 file server will run on a model B BBC computer, whereas the level 2 file server runs on a model B fitted with the 6502 second processor.

File server level 1 - the model B file server

The level 1 file server program will run on a model B BBC computer fitted with Econet and disc interfaces and either a single or dual disc drive. You will need to specify when ordering whether you have a single or a dual disc drive. A complete file server would therefore consist of:

- o File server software on disc 40 track (AES 20)
- o BBC computer model B with disc and Econet interface (ANB 04)
- o Single disc drive (AND 01)
- or
- o File server software on disc 80 track (AES 23)
- o BBC computer model B with disc and Econet interface (ANB 04)
- o Dual disc drive (AND 02)

When the NFS is selected in a station the file server provides a set of commands that replace the equivalent cassette or disc filing system commands. In addition a number of commands are

available for performing functions associated with the network. The following commands are then available to the user:

LOAD *DELETE *NOTIFY *INFO
SAVE *VIEW *DRIVE *ACCESS
*CAT *REMOTE *PROT

In addition the file server can be set to control the maximum number of files allowed per user, and the sections of the disc given to each user.

A section of the file server's disc is also made available to all users to contain a library of frequently used routines and programs.

The level 1 file server uses discs in the same format as local disc storage on a BBC computer, so files may be readily transferred between Econet storage and local disc storage.

With a single drive the file server can store up to 31 files of up to 10K each in length up to a total storage of 100K.

With a dual disc drive this increases to 124 files with a total storage of 800K.

There is no limit on the number of users that may be logged into a file server up to the network maximum of 254 stations, though, of course, the storage available to each user will be limited by the conditions given above.

Any number of file servers may be used on one network.

File server level 2 - the advanced file server

With the addition of a 6502 second processor box to the BBC computer with disc and Econet interfaces, the level 2 server would then consist of:

- o File server level 2 software package on disc (AES 21)

- o BBC model B with disc and Econet interface (ANB 04)
 - o Dual disc drive (AND 02)
 - o 6502 second processor (ANC 01)
- The facilities of the level 1 file server are extended in the level 2 to include:

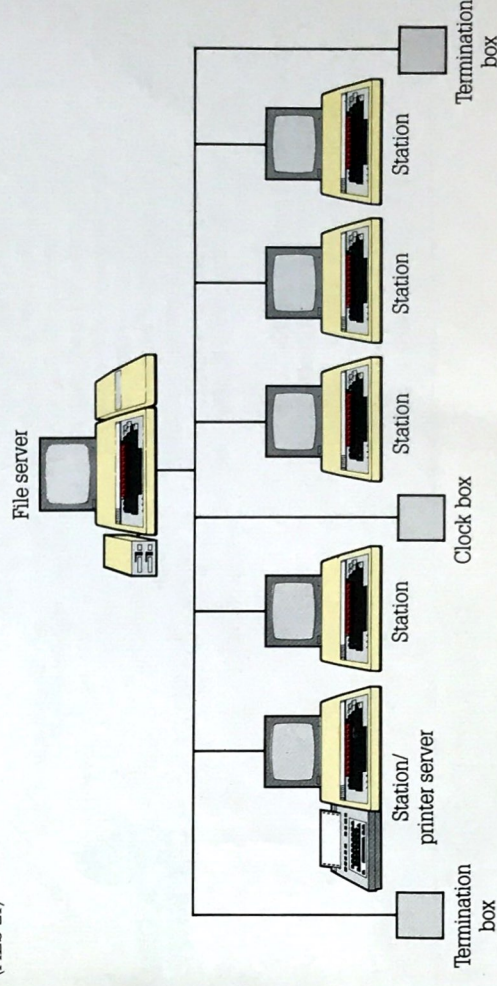
- o Random access to data files
- o Hierarchical directory structures
- o Control of public and private access to files
- o Password protection at log on
- o Extended library facilities
- o System privilege commands to control network facilities
- o Unlimited number of files or directories up to maximum disc storage

The file server is supplied on disc with a number of additional utilities to assist in the management of the file server system, including facilities to create new discs and copy files from BBC computer disc format to file server format.

A second disc is supplied in file server format. This contains a number of demonstration programs and disc based utilities.

The commands available to the user are extended to include:

- *USERS Provides a list of current users
- *DISCS Provides a list of current discs in system
- *DIR Select new directory
- *LIB Select new library
- *SDISC Select new disc
- *PASS Change password
- *CDIR Create new directory
- *NEWUSER System command to create new user
- *REMUSER System command to remove user



A typical network layout

Printer server station

The printer server software is supplied in an EPROM which should be fitted in one of the sideways ROM sockets in the BBC computer. Once fitted in the station with a printer attached, the printer server EPROM allows the other stations on the network to share the use of the printer. If the printer is in use by one station and another station attempts to print, then it will receive a 'not listening' message indicating that the printer is in use. The second station may then stop and try again later when the printer is free. It is recommended that the EPROM should be fitted in the computer by an approved dealer or service centre.

When the printer server EPROM is fitted and running in the printer server computing power is still available at the keyboard and user programs may be run on the printer server station. The printer server, however, can be stopped by pressing the break key, and a dedicated printer server will therefore often be required.

Future developments include the possibility of fitting the printer server in the file server station, providing both shared filing and printing from one dedicated station.

Cables

Acorn supply Econet cables in two ways.

10 station lead set (AEH 18)

For a short network a set of cables and connectors may be used to provide a rapid and convenient system for wiring a group of computers together. The set consists of 10 lengths of cable 1m long and 11 junction pieces and is sufficient to connect together a network of 10 stations including a file and printer server. One or two additional sets may be used to extend the network and the number of machines. The junction pieces are a simple push fit to the cables and no soldering is required to establish or dismantle a network of 10 machines quickly. However, due to the mechanical nature of these connections, this system of wiring is not suitable for networks of over 30 metres. For longer networks a more secure system of wiring is required, and this can be done using lengths of our top specification cable.

100 metres Econet cable (AEH 17)

For long networks Acorn can supply cable to full Econet specification in 100m lengths. This cable is dual twisted pair with a conductor core diameter of 0.9mm, and is suitable for networks of up to 500m. This cable may be tested in a location and then

installed by cutting it to the required lengths and soldering it to 5 pin 180° din sockets mounted as required. Any number of sockets may be fitted on the cable and computers can be plugged in or unplugged at any time. Full details of wiring considerations are supplied with each cable or set of leads.

Clock and termination

Terminator box and power supply (AEH 15)

To prevent reflections on the line and to provide signal conditioning, the Econet cable must be terminated appropriately. Therefore each network requires two terminators, one at each end of the cable. Each terminator set consists of a terminator box and power supply. The boxes and power supplies are each about 2" x 3" x 4". As the power requirements of these units are minimal they can be left connected and switched on continually to ensure that the network is available for use at any time.

Clock box and power supply (AEH 14)

The clock box generates a signal which synchronises all data transferred on the network. The box and power supply are again about 2" x 3" x 4" and take minimal power in order that they may be left permanently connected.

Advice

For full details and advice on how Econet can help you contact your local dealer or:

Econet Sales Department
Acorn Computers Limited
Fulbourn Road
Cherry Hinton
Cambridge CB1 4JN

Service

After sales service and advice by a national dealer network.

Retail Control Systems Limited
Gresham House
Twickenham Road
Feltham
Middlesex TW13 6HA
and
Acorn Computers



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